Road Centerlines – An Update

ND 9-1-1 Association
Quarterly Meeting

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north dakota
GEOGRAPHIC INFORMATION SYSTEMS

Agenda

- Background
- GISTC review
- Validation Study
- Next Steps

Background – Our Goal

- North Dakota needs a seamless, statewide road centerline data set that
  - Is spatially accurate
  - Contains the necessary attributes to be used by multiple applications and users
  - Is maintained
  - Available on the GIS Hub

Background – First Study

- At the December 6, 2006 ND 9-1-1 meeting it was stated the GISTC was funding a study to:
  - Identify best available dataset(s)
  - Estimate the cost
  - Define maintenance workflow
  - Suggest standards
- GeoComm was selected from the GIS Professional Services Contract Pool to conduct the study

Background – Results and Next Steps

- At the June 12, 2007 ND 9-1-1 meeting the results from the study were presented:
  - Draft road centerline standards were developed
  - Counties were classified based on spatial accuracy and attribute completeness
  - Two options presented, use existing data and enhance over time or use existing data that meets the standard and then develop what doesn't
- In January 2008 the 9-1-1 Association's GIS Committee met to review next steps

Background – The Plan

- The 9-1-1 GIS Committee:
  - Drafted a proposal identifying a possible approach to development and maintenance of road centerlines, released May 15
  - Suggested asking for funding during the 2009 Legislative Session
  - Recommended validation of April 2007 estimate by verifying reported attributes, spatial accuracy, and reported miles
- The GISTC funded GeoComm to conduct a validation study to be completed in June 2008

GISTC Review

- The GISTC reviewed the draft proposal from the 9-1-1 GIS Committee:
  - Funding request from the DES
  - Business need for <1 meter accuracy
  - Maintenance plan
  - Use of address points
  - Agrees on need to have a better road centerline dataset
  - Will provide technical support

GISTC Review

- The GISTC met with the 9-1-1 GIS Committee June 13:
  - No need for high spatial accuracy for routing
  - Sub-meter accuracy not required for state agencies
  - May want to focus more on address points
  - There will be more buy-in from state agencies if the centerlines could be derived from the imagery, imagery is in high demand
  - *Outcome: develop statewide centerlines and address points via imagery*

Validation Study

- The draft validation report was released June 16 with a presentation made June 20 to the GISTC and the 9-1-1 GIS Committee
- Assumed standard of 1 meter or better
- Three components covered:
  - Spatial accuracy
  - Attribute accuracy
  - Road miles

Validation Study

- The validation work also included cost estimates for:
  - Routing development
  - Data maintenance
  - Address point development & maintenance
  - Project management

Spatial Accuracy

- Purpose: validate reported accuracy levels
- 3 counties were selected that had reported 3-meter or better accuracies in the 2003 and 2007 surveys
- GeoComm selected *five* positions in each county
- KLJ located these positions, GeoComm compared the field positions to the measured positions to determine accuracy level

Spatial Accuracy

- The National Standard for Spatial Data Accuracy (NSSDA) was used to make the accuracy calculation
- Calculated accuracies for the three counties ranged between 3.23 and 8.414 meters
- Food for thought:
  - Only 5 points, not 20 or more
  - Some data is digitized on the screen

Attribute Accuracy

- Purpose: Determine if existing centerline attributes follow acceptable standards for public safety – compare geocoded location to driveway locations
- 9 counties were selected based on them having an "A" or "B" classification in the 2007 report
- GeoComm used GPS to gather a minimum of 75 driveway locations in each county
- Sample areas based on random selection and available address information

Attribute Accuracy

- The calculation compares the location of an address derived from the centerline range to an actual assigned address, using 528 feet as the threshold (1/10th of the possible addresses per mile)
- Including those locations without a visible address, the percent of addresses outside of 528 feet ranged from 16.67% to 97.14%
- Food for thought:
  - Problems with address ranges in the centerline file: missing, odd/even inconsistency, overlapping ranges
  - Missing street names
  - Addresses not posted on the residence

Road Miles

- Purpose: Refine the estimated road miles per county
- GeoComm reviewed several sources:
  - County departments – verbal and actual
  - StreetWorks (commercial data set)
  - State Treasurer's Office
  - NDDOT
  - Census Bureau TIGER

Road Miles

- Compared various sources and found there are multiple criteria for defining road miles
- Determined that on average, the TIGER data appeared to overestimate road miles an average of 20% compared to actual county data

Road Miles

- GeoComm calculated total road miles by using actual road miles where available and where not, used TIGER – 20%
- In this approach, the total number of miles is 102,412, about 4% less than the total DOT miles.

Other Items

- Routing: Includes attributes needed for basic routing, assumes all counties
- Maintenance: Provide counties the ability to maintain data at set standard by providing GPS equipment, training
- Address Points: GPS and verified, estimates 68,162 points for rural areas, assumes all counties
- Project Management: Includes both development and maintenance. Provides point of contact and assistance in developing RFP template.

GeoComm Recommendations

- Deliver validation information back to participating counties for their review
- Include data synchronization analysis in the development costs (sync GIS data with MSAG and ALI)
- Address point development would be beneficial
- RFP language to include process of determining road miles
- Project management will provide expertise in development and maintenance of data, and will ensure quality

Estimated Costs

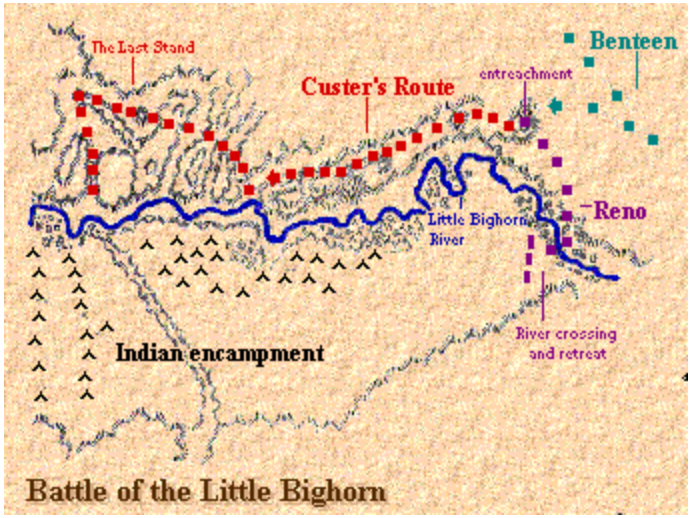
- Centerlines:
  - 2007 Study: $1.85 million (Option 2)
  - 2008 Validation: $2.23 million
- Project management: $90,120
- Address points (all counties): $1.25 million
- GPS upgrade (10 counties): $65,000
- Annual maintenance:
  - Centerlines: $290,590 (includes project management, "C" counties)
  - Address Points: $370,940 (done in conjunction with centerlines, all counties)

Next Steps

- Publish validation report and presentation
- GISTC produces final recommendation which includes an estimate of cost and maintenance approach using aerial imagery
- Consensus between 9-1-1 GIS Committee and GISTC on the approach to take to build a seamless and multi-purpose dataset
- Funding request for 2009-2011 Biennium

The Hope

- Not to mimic an event that happened 132 years ago today



Graphics from www.eyewitnesstohistory.com

Questions & Comments?

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